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GLYCAEMIC RESPONSE AND THE GLYCAEMIC INDEX OF FOODS: MORE REMAINS TO BE SEEN ON THE SECOND-MEAL EFFECT OF PROTEINS.

Corresponding Author: *Furio Brighenti*
Additional Authors: Cyril WC Kendall, Livia SA Augustin, Fred JPH Brouns, Carlo La Vecchia, Jordi Salas-Salvadó, Gabriele Riccardi

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GLYCAEMIC RESPONSE AND THE GLYCAEMIC INDEX OF FOODS: MORE REMAINS TO BE SEEN ON THE SECOND-MEAL EFFECT OF PROTEINS.

Sir,

The paper from Meng et al (1) provides interesting information about the so called second-meal effect, i.e. the ability of a previous meal to influence the postprandial glycaemic response of a meal consumed later in time. This information is welcome since, in addition to offering new evidence on the effect of nutrients on human physiology and metabolism, it may also strengthen the rationale and methodology upon which GI must be measured in foods.

The new finding of this carefully conducted crossover short-term intervention study is that isoglucidic amounts of solid (bread) and liquid (glucose drink) high-GI foods consumed at lunch behave differently when they are preceded by breakfasts with different GL but similar GI, differences in GL being obtained by substituting available carbohydrates with protein or fat. Figure 1 reports the amount of macronutrients and GL of the three breakfast challenges.

In particular, when a breakfast containing 50 g of (mainly animal, non-dairy) protein is compared to isocaloric breakfasts containing half the amount of (mainly animal, dairy) protein, both glucose and insulin postprandial responses are reduced after a bread but not after a glucose challenge consumed 4 hours later. Although the study lacks information on either direct or indirect markers of gastric emptying, the authors reasonably infer that the difference in postprandial glucose and insulin after the High-Protein breakfast might be due to a lowering of the gastric empting rate during the following meal, since it affects solid foods but not beverages.

However, the observed differences in the effect elicited by Glucose and Bread on blood glucose and insulin responses also confront a number of known mechanisms regulating glucose metabolism, such as the Straub-Traugott effect (CHOs ameliorate the following glucose response)(2); the Randle's Cycle (NEFA impair glucose metabolism by competition in the glucose-fatty acid cycle) (3); the insulinotropic effects of dairy proteins (whey reduces glucose responses by stimulating insulin release) (4). A description of the response curves after the first meal might have helped to interpret the metabolic situation after the different breakfasts as well as to assess their reproducibility.

Nevertheless, the data open a number of possibilities for well designed studies aimed to deepen our knowledge on the mechanisms that might be involved when solid vs. liquid sources of CHO are consumed in real life.

Yet, far from pointing out the opening of such exciting new research perspectives, the main message delivered by the authors seems more focused on proving that GI is a rather poor index of carbohydrate quality, since measuring it at lunch changes the apparent ranking of bread compared to glucose.

On the contrary, the results clearly demonstrate that, once understood that the GI is a property of food, it must be calculated following a stable protocol in order to provide meaningful results. Indeed, the protocol for GI measurement (food consumed in the morning after an overnight fast) (5) is not optional; his definition do derive exactly by the knowledge that glycaemic responses at lunch depend on what happens beforehand, and that relative responses are not necessarily the same as they are after an overnight fast.

So, the authors' claim that the nature of the previous meal changes the food GI is incorrect. In fact, what the nature of the previous meal changes is the glycaemic response of solid vs. liquid foods. The critical question in this respect that remains unanswered is whether the ranking among foods (i.e. the GI) is changed by the nature of the previous meal. In other words, do low-GI foods elicit higher glycaemic responses than high-GI ones according to the composition of the previous meal? This would be interesting (and surprising) if actually proven and explained.

Indeed, the epidemiological and clinical evidence about the benefit of reducing dietary GI calculated from the GI of individual foods measured following the ISO protocol, far from being contradictory, is reasonably consistent and overall strong for a number of chronic disease and markers of disease, given inevitable differences in populations and study designs (6-8). This suggests that dietary modifications achieved by selecting low-GI foods might be an important contribution to a preventive lifestyle and should be encouraged (9).

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Authors and Affiliation:

Furio Brighenti [a], Cyril WC Kendall [b], Livia SA Augustin [c], Fred JPH Brouns [d], Carlo La Vecchia [e], Jordi Salas-Salvadó [f], Gabriele Riccardi [g], On behalf of the International Carbohydrate Quality Consortium, ICQC.

[a] *Department of Food & Drug, University of Parma, Italy*

[b] *Department of Nutritional Sciences, University of Toronto, Canada*

[c] *Clinical Nutrition and Risk Factor Modification Centre, St. Michael's Hospital, Toronto, Canada*

[d] *School of Nutrition and Translational Research in Metabolism, Maastricht University, the Nederlands*

[e] *Department of Clinical Sciences and Community Health, Università degli Studi di Milano, Italy*

[f] *Biochemistry and biotechnology Department, Universitat Rovira i Virgili, Reus, Spain*

[g] *Department of Clinical Medicine & Surgery, Federico II University Naples, Italy*

94 Tables:

95 *Table 1: calculated amount of macronutrients and GL of the breakfast meals.*

Breakfast	Amount of CHO (g)	Amount of Protein (g)	Amount of fat (g)	GL calculated
H-CHO	107.3	23.1	15.4	61.1
H-Protein	85.4	50.3	14.1	48.5
H-Fat	65.1	25.1	34.1	34.7

96 *Amount of macronutrients and GL were calculated from the % En meal composition and GI reported in Table*
97 *1 (supplemental material) using 4, 4 and 9 kcal/g respectively for carbohydrate, protein and fat.*
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